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IS 2786-2 (1984): ceramic dielectric capacitors, type 2: Part 2 FCCG 01 and FCCG 02 capacitors [LITD 5: Semiconductor and Other Electronic Components and Devices]

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IS : 2786 (Part 2) - 1984

(Reaffirmed 2002)

Indian Standard

SPECIFICATION FOR CERAMIC DIELECTRIC CAPACITORS TYPE 2

PART 2 FCCG 01 AND FCCG 02 CAPACITORS

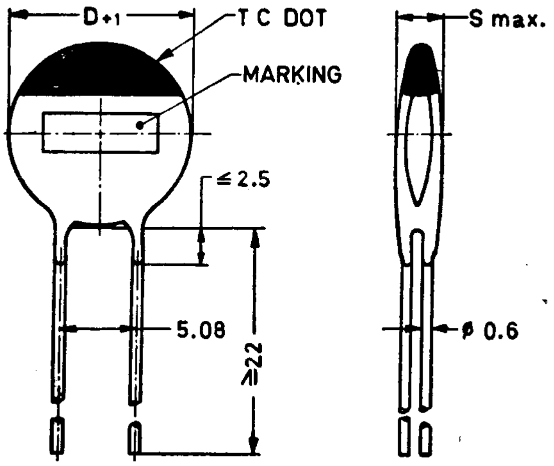
0. General — This standard (Part 2) shall be read in conjunction with IS : 2786 (Part 1) -1978 'Ceramic dielectric capacitors type 2 : Part 1 General requirements and methods of tests (*first revision*)'.

1. Scope — Covers detail requirements for fixed, ceramic dielectric general purpose (type 2) capacitor of following:

Designation		*Description*
FCCG 01	—	a) Disc, insulated, 63 V dc. b) Disc, insulated, 400 V dc.
FCCG 02	—	Plate, insulated, 63 V dc.

2. Outline Drawing and Dimensions — The outline drawing and dimensions for different types shall be as follows:

2.1 *FCCG 01* — Disc, insulated, 63 V dc.

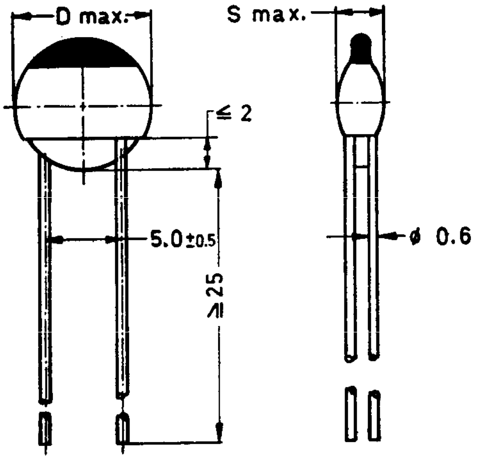


All dimensions in millimetres

FIG. 1 OUTLINE DRAWING AND DIMENSIONS

2.1.1 *Dimensions and ratings* — As given in Table 1.

2.2 *FCCG 01* — Disc, insulated, 400 V dc.



All dimensions in millimetres

FIG. 2 OUTLINE DRAWING AND DIMENSIONS

Capacitors Sectional Committee, LTDC 15; Capacitors Subcommittee LTDC 15 : 1 [Ref : Doc : LTDC 15 (459)]

Adopted 15 February 1984

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2.2.1 *Dimensions and ratings* — As given in Table 2.

2.3 *FCCG 02* — Plate insulated, 63 V dc.

2.3.1 *Dimensions and ratings* — As given in **2.3.1.1** to **2.3.1.4** and Table 3.

2.3.1.1 *Lead spacing (pitch P)* — 2·54 or 5·08 mm.

2.3.1.2 *Thickness* — $\leqslant$ 2·1 mm.

2.3.1.3 *Lead diameter* — > 0·6 mm.

2.3.1.4 *Lead length* — 15 mm, *Min.*

3. Rating and Characteristics

a) Selection Tolerance	*See* Table 1, Table 2 and Table 3A and 3B
b) Climatic Category	40/085/21 for Capacitors with ±20 percent and ${}^{+50}_{-20}$ percent tolerance 10/055/21 for capacitors with ${}^{+80}_{-20}$ percent tolerance
c) Low Air Pressure	8·5 KPa
d) Bump	4 000 Bumps, 400 m/s
e) Vibration	10-55-10 Hz, 0·75 mm displacement 6 hours duration

4. Marking — *See* **8** of IS : 2786 (Part 1)-1978.

5. Materials, Construction and Workmanship — *See* **6** of IS : 2786 (Part 1)-1978.

6. Classification of Tests — *See* **9.1** of IS : 2786 (Part 1)-1978.

6.1 *General Conditions of Tests* — **See 9.2** of IS : 2786 (Part 1)-1978.

6.1.1 *Schedule of type tests* — The test schedule and specific requirements shall be in accordance with Table 4.

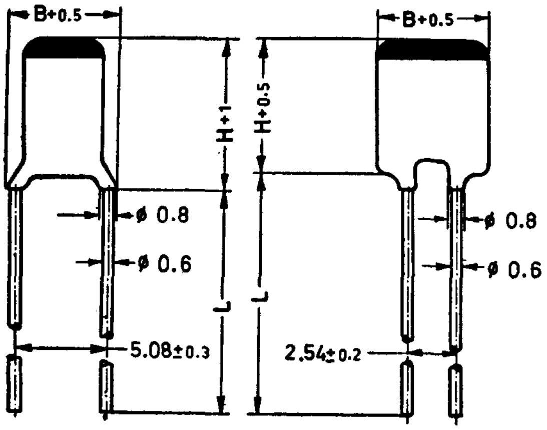
TABLE 1 DIMENSIONS AND RATINGS
(*Clause* 2.1.1)

Value (1) pf	Capacitor *D* (2) mm	Dimensions *S. Max* (3) mm	Capacitor *D* (4) mm	Dimensions *S. Max* (5) mm	Capacitor *D* (6) mm	Dimensions *S. Max* (7) mm
150	6·2	4·40	—	—	—	—
180	6·2	4·00	—	—	—	—
220	6·2	3·80	—	—	—	—
393	6·2	3·00	—	—	—	—
370	6·2	3·00	—	—	—	—
460	7·2	3·00	6·2	4·05	—	—
580	8·7	3·65 ±20 percent	6·2	3·80	—	—
600	8·7	3·40	6·2	3·55	—	—
820	8·7	3·10	6·2	3·25	—	—
1 000	8·7	3·00	7·2	3·10	6·2	3·80
1 200	9·7	3·05	7·2	2·90	6.2	3·60
1 500	9·7	2·90	7·2	2·90	6·2	3·30
1 800	12·2	3·10	8·7	3·40 +50 −20 percent	7·2	3·50
2 200	12·2	3·00	9·7	3·50	7·2	3·35
2 700			9·7	3·00	8·7	3·60
3 300			9·7	3·00	8·7	3·40 +80 −20 percent
3 900			12·2	3·30	8·7	3·10
4 700			12·2	3·10	8·7	3·00
5 600			12·2	3·00	8·7	2·90
6 800					9·7	2·85
8 200					12·2	3·05
10 000						3·00

TABLE 2 DIMENSIONS AND RATINGS

(*Clause* 2.2.1)

Capacitance		*D*	*S Max*
(1)		(2)	(3)
pf		mm	mm
100	+50 −20 percent	5	4·5
150		5	3·5
220		6	3·5
330		6	3·0
470		6	3·0
680		6	3·0
1 000		8	3·0
1 500		9	3·0
2 200		8	3·0
3 300		9	3·0



(a) (b)

FIG. 3 OUTLINE DRAWING AND DIMENSIONS

TABLE 3 DIMENSIONS AND RATINGS

(*Clause* 2.3.1)

Rated Capacitance		**Dimensions**	
C_R		$B \times H$	
		p = 5·08 mm	p = 2·54 mm
(1)		(2)	(3)
pf		mm × mm	mm × mm
1 000	+80 −20 percent	6 × 5	3 × 4
2 200		6 × 5	3 × 4
4 700		6 × 5	3 × 4
10 000		6 × 6	4 × 5
22 000		6 × 8	6 × 7

TABLE 4 TEST SCHEDULE AND REQUIREMENTS

(*Clause* 6.1.1)

Sl No.	**Test**	**Clause Ref of IS : 2786 (Part 1) - 1978**	**Condition of Test**	**Requirements**
(1)	(2)	(3)	(4)	(5)
i)	*All samples* (*Group O*)			
	a) Visual examination	9.4.1	—	The condition, workmanship and finish shall be satisfactory. The marking shall be legible.
	b) Dimensions	9.4.2	—	Dimensions of the relevant type of capacitors and their terminations shall conform to the values given in 2.
	c) Capacitance	9.3.1	Measuring frequency: a) 1 MHz ± 10 percent for rated capacitance $\leqslant$ 100 pF b) 1 kHz ± 10 percent for rated capacitance > 100 pF	The capacitance value shall be within the rated capacitance taking into account the tolerance.
	d) Tangent of loss angle (Tan δ)	9.3.2	Measuring frequency: same as in Sl No. (i) (c)	As specified.
	e) Voltage proof (For insulated type only) 1 min duration	9.3.4	As specified. For feed through capacitors the voltage shall be applied between one element termination and the ring.	As specified.
	f) Insulation resistance	9.3.3	As specified. For feed through capacitors between one element termination and the ring.	As specified.
ii)	*First Group*			
	a) Robustness of terminations (Not applicable to feed-through type)	9.4.3	As specified	—
	1) Visual examination	9.4.1	—	There shall be no visible damage.
	b) Solderability	9.4.4.1	As specified	—
	1) Visual examination	9.4.1	—	There shall be no visible damage.
	c) Bump	9.4.6	As specified. 4 000 bumps in 2 directions, $400\ m/s^2$,	—
	1) Visual examination	9.4.1	—	There shall be no damage.
	2) Capacitance	9.3.1	—	The change in capacitance from the value recorded in Sl No. (i) (c) snall not exceed 20 percent.
	3) Tangent of loss angle	9.3.2	—	As in Sl No. (i) (d).
	4) Insulation resistance	9.3.3	—	As in Sl No. (i) (f).
	d) Vibration	9.4.5	As specified. Severity of 10-55-10 Hz, 0·75 mm displacement. 3 directions—6 hrs duration (mutually perpendicular)	—

(*Continued*)

TABLE 4 TEST SCHEDULE AND REQUIREMENTS — *Contd*

Sl No.	Test	*Clause Ref* IS : 2786 (Part 1) - 1978	*Condition* of Test	*Requirements*
(1)	(2)	(3)	(4)	(5)
	1) Visual examination	9.4.1	—	There shall be no damage.
	2) Capacitance	9.3.1	—	The change in capacitance from the value recorded in Sl No. (i) (c) shall not exceed 20 percent.
	3) Tangent of loss angle	9.3.2	—	As in Sl No. (i) (d).
	4) Insulation resistance	9.3.3	—	As in Sl No. (i) (f).
	e) Rapid change of temperature	9.5.3	As specified	—
	1) Visual examination	9.4.1	—	There shall be no damage.
	2) Capacitance	9.3.1	—	As specified.
	3) Tangent of loss angle	9.3.2	—	As in Sl No. (i) (d)
	4) Insulation resistance	9.3.3	—	As in Sl No. (i) (f).
	f) Climatic sequence	9.5.1	—	—
	1) Dry heat	9.5.1.3	As specified	—
	2) Damp heat (accelerated) (first cycle)	9.5.1.4	As specified (one cycle)	—
	3) Cold	9.5.1.5	As specified	—
	4) Air pressure (low)	9.5.1.6	As specified	—
	5) Damp heat accelerated (remaining cycles)	9.5.1.7	As specified	—
	Final measurements			
	i) Visual examination	9.4.1	—	There shall be no damage
	ii) Capacitance	9.3.1	As specified	As specified
	iii) Tangent of loss angle	9.3.2	As specified	As specified
	iv) Insulation resistance	9.3.3	As specified	As specified
iii) *Second Group*				
	a) Damp heat (steady state)	9.5.2	As specified. Rated voltage shall be applied on half the number of samples and no voltage applied on remaining quantity	—
	1) Visual examination	9.4.1	—	There shall be no visible damage.
	2) Voltage proof	9.3.4	—	There shall be no breakdown or flashover.
	3) Insulation resistance	9.3.3	—	As specified
	4) Capacitance	9.3.1	—	As specified
	5) Tangent of loss angle	9.3.2	—	As specified
iv) *Third Group*				
	a) Temperature characteristic of capacitance (without voltage applied to half of the lot)	9.3.5	As specified	—
	1) Capacitance	9.3.1	—	As specified
	b) Temperature characteristics (with direct voltage applied to other half of the lot)	9.3.5	—	—
	1) Capacitance	9.3.1	—	As specified

(*Continued*)

TABLE 4 TEST SCHEDULE AND REQUIREMENTS — *Contd*

Sl No.	Test	Clause Ref of IS : 2786 (Part 1) - 1978	Condition of Test	Requirements
(1)	(2)	(3)	(4)	(5)
	c) Life (electrical) (endurance)	9.6.2	As specified	—
	1) Visual examination	9.4.1	—	There shall be no visible damage.
	2) Capacitance	9.3.1	—	As specified
	3) Tangent of loss angle	9.3.2	—	As specified
	4) Voltage proof	9.3.4	—	There shall be no breakdown or flashover.
	5) Insulation resistance	9.3.3	—	As specified
v)	*Fourth Group*			
	a) Mould growth	9.5.5	As specified	As specified
vi)	*Fifth Group*			
	a) Resistance to soldering heat (thermal shock)	9.4.4.2	As specified	—
	1) Visual examination	9.4.1	—	There shall be no visible damage.
	2) Capacitance	9.3.1	—	As specified
	3) Tangent of loss angle	9.3.2	—	As in Sl No. (i) (d).
	4) Insulation resistance	9.3.3	—	As in Sl No. (i) (f).
vii)	*Sixth Group*			
	a) Salt mist (Applicable to feed through and stand-off types only)	9.5.4	As specified	—
	1) Visual examination	9.4.1	—	There shall be no visible damage.
	2) Voltage proof	9.3.4	—	There shall be no breakdown or flashover.
	3) Insulation resistance	9.3.3	—	As in Sl No. (i) (f).
	b) Resistance to solvents	9.6.3	As specified	As specified.

Note — Wherever the term 'As specified' is mentioned against the specific test condition or 'requirements' column it indicates that the details are given in corresponding clause of IS : 2786 (Part 1) - 1978.

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